APPENDIX E
OF
CLEANUP ACTION PLAN
ABLE PEST CONTROL SITE
KENMORE, WASHINGTON
FARALLON PN: 602-002

QUALITY ASSURANCE PROJECT PLAN

Submitted By
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For:
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1.0 INTRODUCTION

This Draft Quality Assurance Project Plan (herein referred to as the Plan) identifies data quality objectives and standard operating procedures to be implemented in accordance with the Cleanup Action Plan (CAP) for the Able Pest Control Site as defined below located in Kenmore, Washington. This Plan is incorporated within the draft CAP as Appendix E.

Work to be performed during the CAP will be conducted in accordance with the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Washington Administrative Code (WAC) 173-340-810, 29 USC Sec. 651 et esq. The purpose of this Plan as stated in Ecology's *Guidance and Specifications for Preparing Quality Assurance Project Plans* is to:

- Help the project manager and project team focus on the factors affecting data quality during the planning stage of the project;
- Facilitate communication among field, laboratory, and management staff as the project progresses; and,
- Provide a record of the project to facilitate final report preparation.

To insure that the data quality objectives (DQOs) are achieved, this Plan details aspects of sample collection and analysis including: sample collection procedures, analytical methods, quality assurance/quality control (QA/QC) procedures, and data quality reviews. This Plan describes both quantitative and qualitative measures of data quality to assure that data quality objectives are achieved.

1.1 DEFINITION OF THE SITE

The entire site consists of a residential lot located at 18115 62nd Avenue Northeast, the northwest portion of the Preschool Property located at 6124 NE 181st Street and a small portion of the property adjacent and north of the 62nd Avenue Property in Kenmore, Washington. The portion of the site addressed by the CAP is the area where soil contains concentrations of one or more of the target pesticides above the applicable cleanup levels. This includes the 62nd Avenue Property and a small potion of the north-adjacent property (referred to as the site in the CAP and this Plan). As discussed in the CAP, interim actions conducted at the Preschool Property have cleaned up the soils in this portion of the entire site.

The site is located approximately 1,200 feet from the northern end of Lake Washington and is currently zoned for residential use by the city of Kenmore. Land use surrounding the site includes single-family residences to the northwest and east; a vacant, vegetated lot to the north; a multi-unit condominium building to the west-southwest; and a preschool to the south. Residences in the vicinity of the site are connected to the municipal water supply and the sewer discharges to King County Department of Natural Resources, Industrial Waste Program. The future land use of the immediate site area is projected to remain single family or multi-unit residential.

The legal description for the 62nd Avenue Property is:

The portion of Government Lot 3, Section 11, Township 26 North, Range 4 East W.M., in King County, Washington, described as follows:

Beginning at the north quarter corner of said Section,
Thence south 2^0 41' 16" W along the centerline of said Section, a distance of 1000.151 feet;
Thence west 30.03 feet to the true point of beginning;
Thence west 152.705 feet;
Thence south 99.33 feet;
Thence north 87^0 14' 47" E to a point from which the true point of beginning bears north $2^0$41'16"E;
Thence north 2^0 41' 16" E to the true point of beginning;
(Being known as Lot 2, Block 8, Waverly Park, according to the unrecorded plat thereof, except the southerly 85.00 feet, as measured along the west line thereof, and Lot 3 in said block, except the northerly 65.00 feet as measured along the west line thereof).

The 62nd Avenue Property is currently developed with a residential home with ground level and second-floor living units and a separate two-car, dirt-floor garage. The floor of the ground-level apartment is a concrete slab approximately two to three feet below the outside grade. A gravel driveway is located along the northern portion of the 62nd Avenue Property. Lawn, shrubs, or other vegetation covers the remaining areas of the site.

1.2 BACKGROUND INFORMATION

Mr. Sheridan Martin owned the 62nd Avenue Property between 1969 and 1986 and operated a pest control company called Able Pest Control, Inc. from the residence. In late 1985, Mr. Martin sold Able Pest Control, Inc. to Mr. Tom E. Reed and Mr. James W. Nation. Mr. Reed and Mr. Nation formed a corporation named Able Pest Control, Inc. This corporation operated at the 62nd Avenue Property between November 1985 and January 1986. Operations at the 62nd Avenue Property conducted by both corporations involved storing and dispensing pesticides for off-site use. The pesticides were stored and dispensed in an area underneath the back porch located at the southwestern corner of the building.

The 62nd Avenue Property was sold to Ms. Schlittenhard on November 14, 1986. Ms. Schlittenhard converted the residence into two apartments, one on the ground-floor level and the other on the upper level of the residence. In 1994, during expansion of the ground-floor apartment, soil was excavated from the former pesticide storage and dispensing area located at the southwest corner of the residence to construct a concrete floor slab. The excavated soil was reportedly placed in the southwestern corner of the 62nd Avenue Property adjacent to the fenced property line with the Preschool Property. Prior to the interim remedial action program (SECOR, January 15, 1999), the ground surface in this area was either exposed soil or covered by grass, blackberries, and other vegetation, and it sloped towards the south-southwest with a small (<1 foot) drop at the property line.

A detailed description of the site history and remedial actions are provided in the CAP.

1.3 PROJECT OBJECTIVES

The key objective of this work is to efficiently and effectively perform soil excavation and disposal to remediate target pesticides in the shallow soils at the 62nd Avenue Property.

The CAP has defined three main excavation areas at the 62nd Avenue Property and adjacent off-site areas based on the features at the 62nd Avenue Property and previous investigations at the site. The sampling protocols for each excavation area take into account the historical property use and potential for the release of pesticides. The three main excavation areas defined in the Sampling and Analysis Plan (SAP, Appendix C) include:

- Contamination Reduction Corridor (CRC) Excavation Area;
- ExteriorExcavation Area (EXT), which includes all outside areas with the exception of the CRC area; and,
- Interior Excavation Area (INT), which includes the small area beneath the southwest corner of the existing residence.

2.0 PROJECT ORGANIZATION

Ecology has identified Sheridan A. Martin (deceased, December 1998) and Sharon Schlittenhard as potentially liable persons (PLPs) under RCW 70.105D.040. The primary contacts for the PLPs are:

For Sheridan A. Martin:

Ms. Sharon Keller
Personal Representative for the
Estate of Sheridan Martin
c/o Mr. William Joyce
Ogden Murphy Wallace, PLLC
1601 5th Ave, Suite 2100
Seattle, Washington 98101
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Fax (206) 447-0215

For Sharon Schlittenhard

Mr. John Wiegenstein
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Poulsbo, Washington 98370
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Fax (360) 394-3503

The PLPs have contracted with Farallon Consulting, L.L.C. (Farallon) to conduct the CAP. The Project Manager and primary contact for Farallon is:

Peter Jewett
Principal Engineering Geologist
Farallon Consulting, L.L.C.
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Fax (425) 427-0067

and the QA/QC Officer is:

Mr. Clifford T. Schmitt
Principal Hydrogeologist
Farallon Consulting, L.L.C.

Ecology is acting as the lead public agency for the project. The primary contact for Ecology is:

Ms. Louise Bardy
Project Coordinator-Toxics Cleanup Program
Washington State Department of Ecology-Northwest Regional Office
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Bellevue, WA 98008
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Fax (425) 649-7098

3.0 DATA QUALITY OBJECTIVES

The DQOs for this project will be used to develop and implement procedures to ensure that data is of sufficient quality to remediate the pesticide contamination throughout the three excavation areas defined in the CAP. All observations and measurements will be made and recorded in such a manner as to yield results representative of the media and conditions observed and/or measured. Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, natural variation at a sampling point, or an environmental condition. Representativeness will be achieved through strict adherence to the SAP (Appendix C). Goals for representativeness will be met by ensuring that sampling locations are selected properly and that a sufficient number of samples are collected.

The quality of the laboratory data will be assessed by precision, accuracy, representativeness, comparability, and completeness (the "PARCC" parameters). Definitions of these parameters and the applicable quality control procedures are described in Subsections 3.1 through 3.5 of the Plan. Quantitative DQOs for applicable parameters (e.g., precision, accuracy, completeness) are provided

following each definition. Laboratory DQOs have been established by the analytical laboratory and are specified in the analytical laboratory Quality Assurance Program which is kept on file at Farallon's offices.

3.1 PRECISION

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of two or more measurements compared to their average values. Precision is calculated from results of duplicate sample analyses. Precision is quantitatively expressed as the relative percent difference (RPD), and is calculated as follows:

$$RPD = \frac{(C_1 - C_2)}{(C_1 + C_2)/2} \, x \, 100$$

Where:

RPD = relative percent difference

C_1 = larger of the two duplicate results (i.e., the highest detected concentration)

C_2 = smaller of the two duplicate results (i.e., the lowest detected concentration)

Quantitative RPD criteria for laboratory duplicate results have been developed by the U.S. Environmental Protection Agency (USEPA) for inorganic analysis. The criteria are $\pm$ 20 percent for water samples and $\pm$ 35 percent for soil. There are no specific RPD criteria for organic analyses.

3.2 ACCURACY

Accuracy is a measure of the closeness (bias) of the measured value to the true value. The accuracy of chemical analyses results is assessed by "spiking" samples in the laboratory with known standards (surrogates or matrix spikes of known concentration) and determining the percent recovery. The accuracy is measured as the percent recovery (%R) and is calculated as follows:

$$\%R = \frac{(M_{sa} - M_{ua})}{C_{sa}} \, x \, 100$$

Where:

%R = percent recovery

M_{sa} = measured concentration in spiked aliquot

M_{ua} = measured concentration in unspiked aliquot

C_{sa} = actual concentration of spike added

Laboratory matrix spikes and surrogates will be carried out at the analytical laboratory in accordance with USEPA SW-846 requirements for organic and inorganic analyses. Quantitative percent recovery criteria have been developed by the USEPA for laboratory matrix spikes for inorganic analysis. The criteria are 75 to 125 percent, when the sample concentration exceeds the spike concentration by a factor of four or more. There are no specific accuracy criteria for organic analyses. Where the USEPA and Ecology have not provided data validation guidelines, laboratory derived control limits will be used to assess surrogate recovery and matrix spike results.

The accuracy of sample results can also be affected by sample contamination. Sample contamination can occur because of improperly cleaned sampling equipment, exposing samples to chemical concentrations in the field or during transport to the laboratory, or because of chemical concentrations in the laboratory. To ascertain that the samples collected are not contaminated, several types of blank samples will be analyzed.

3.2.1 Equipment Rinsate Blanks

Equipment rinsate blanks, consisting of analyte-free water which has been used as a final rinse of sampling equipment (following equipment decontamination), will be used to determine if sample contamination occurred as a result of improperly cleaned sampling equipment. Where decontamination is required (e.g., soil sampling equipment, excavators), the number of equipment rinsate blanks will be at least five percent of the total number of samples collected.

3.2.2 Laboratory Method Blanks

The laboratory will run method blanks at a minimum frequency of five percent or one per batch to assess sample contamination within the laboratory.

3.3 REPRESENTATIVENESS

Representativeness is a qualitative measure of how closely the measured results reflect the actual concentration or distribution of the constituent concentrations in the matrix sampled. The sampling plan design, sampling collection techniques, sample handling protocols, sample analysis methods, and data review procedures have been developed to assure the results obtained are representative of site conditions. These issues are addressed in detail in the SAP (Appendix C) and the Plan.

3.4 COMPLETENESS

Completeness is defined as the percentage of measurements judged to be valid. Results will be considered valid if they are not rejected during data validation (see Section 6.0 Data Management, Reduction, Review and Reporting). Completeness is calculated as follows:

$$C = \frac{(Number\ of\ Valid\ Measurements)}{(Total\ Number\ of\ Measurements)}\ x\ 100$$

The target completeness goal for this work will be 90 percent for a given analysis.

3.5 COMPARABILITY

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. The use of standard USEPA and Ecology methods and procedures for both sample collection and laboratory analysis will make data collected comparable to both internal and other data generated.

4.0 SAMPLING PROCEDURES

Procedures that will be used to collect, preserve, transport, and store samples are described in the SAP provided in Appendix C of the CAP.

5.0 ANALYTICAL PROCEDURES

Chemical and physical analyses to be conducted during this project are discussed in the SAP provided in Appendix C of the CAP.

6.0 DATA MANAGEMENT, REDUCTION, REVIEW, AND REPORTING

This section outlines procedures to be followed for the inventory, control, storage, and retrieval of data collected during performance of the CAP. The procedures contained in this plan are designed to ensure that integrity of the collected data is maintained for subsequent use. Moreover, project tracking data (e.g., schedules and progress reports) will be maintained to monitor, manage, and document the progress of this cleanup action.

Farallon will maintain the project files according to the procedures outlined in this document and the Agreed Order (pending). Data generated during field activities and by laboratory analyses will be submitted directly to Farallon. Laboratory documentation from the analytical laboratories will be maintained in Farallon's project file for purposes of validating analytical data collected during the cleanup action.

6.1 DATA TYPES

A variety of data will be generated by this cleanup action, including sampling and analytical data, review of published reports, and calculation results based on mathematical expressions. The laboratory analytical data will be transmitted to Farallon as an electronic file, in addition to a hard copy. This will facilitate the subsequent validation and analysis of these data while avoiding transcription errors that may occur with computer data entry.

6.2 DATA TRANSFER

Procedures controlling the receipt and distribution of incoming data packages to Farallon and outgoing data reports from Farallon are outlined below.

6.2.1 Receipt of Data and Reports

The incoming documents will be date stamped and filed as follows. Correspondence and transmittal letters for all reports, maps, and data will be filed chronologically. Data packages, such as those from field personnel, laboratories, and surveyors (such as soil analytical data, survey data, and geologic observations), will be filed by project task, subject heading and date. If distribution is required, the appropriate number of copies will be made and distributed to appropriate persons or agencies. The original document will not be distributed to project personnel.

6.2.2 Outgoing Data and Reports

A transmittal sheet will be attached to all project data and reports sent out. A copy of each transmittal sheet will be kept in the project file. All outgoing reports and maps will be reviewed by the Project Manager and QA/QC Officer.

6.3 DATA INVENTORY

Procedures for filing, storage, and retrieval of project data and reports are discussed below.

6.3.1 Document Filing and Storage

As previously discussed, project files and raw data files will be maintained at Farallon. Files will be organized by project tasks or subject heading, and maintained by the document control clerk.

6.3.2 Access to Project Files

Access to project files will be controlled and limited to the PLPs, and Farallon personnel. Project documents will be listed according to task. Project documents will be assigned a document control number and a log will be maintained for all documents contained in the file. When a file is removed for use, a sign-out procedure will be used to track custody.

If a document is to be used for a long period, a copy will be used, and the original will be returned to the project file.

6.4 DATA REDUCTION AND ANALYSIS

The Project Manager and Project QA/QC Officer are responsible for data review and validation. Data validation parameters are outlined in Section 3.0. The particular type of analyses and presentation method selected for any given data set will depend on the type, quantity, quality, and prospective use of the data in question. The analysis of the project data is likely to require data reduction for the preparation of tables, charts, and maps, etc. To ensure that data are accurately transferred during the reduction process, all reduced data will be checked by someone other than the person that prepared the map, table, or chart. All items checked will be initialed and dated. Any incorrect transfers of data will be highlighted and changed.

6.4.1 Data Reporting Formats

The physical and chemical characterization information developed for soil and wastewater at the site in connection with the CAP will be presented in the final report in the following format.

6.4.1.1 Summary Tables

The laboratory reports will be sorted according to various parameters to summarize the information for easier assimilation and presentation. Soil sampling and analysis data will be sorted several ways, including by sample point number, constituent, and date of sample collection. The parameters chosen for sorting will depend on the determination of the most appropriate format, and the utility of that format in demonstrating the physical and chemical characteristics of interest.

6.4.1.2 Maps

Plan maps needed to illustrate results of the CAP will be assembled or prepared. They may include, but are not limited to plan maps of the site showing chemical concentration for individual chemicals and groups of chemicals.

6.4.1.3 Cross-Section

Vertical profiles, or cross-sections, may be generated from field data to display site stratigraphy, and the vertical and lateral extent of the final excavations.

6.5 TELEPHONE LOGS AND MEETING NOTES

All notes from project meetings and telephone conversations will be maintained in the project file by the Project Manager. Field notes will be retained by project field personnel until the conclusion of the field program when they will be filed with the other project documents.

7.0 QUALITY CONTROL PROCEDURES

7.1 FIELD QUALITY CONTROL

Field Quality Control samples (e.g., duplicate samples and equipment rinsate blanks) to be collected during this project are described in Section 2.2 of the SAP (Appendix C). The purpose of these samples was also discussed in Section 3.0 of the Plan.

7.2 LABORATORY QUALITY CONTROL

Analytical laboratory QA/QC procedures are provided in the laboratory Quality Assurance Plan which is on file at Farallon's offices.

7.3 DATA QUALITY CONTROL

All data will undergo two levels of QA/QC evaluation: one by the laboratory and one by Farallon. Initial data reduction, evaluation, and reporting will be performed by the laboratory as specified in the laboratory Quality Assurance Plan. The analytical data will then be validated at Farallon under supervision of the QA/QC Officer. The following types of quality control information will be reviewed, as appropriate:

- Method deviations;
- Sample extraction and holding times;
- Method reporting limits;
- Blank samples (equipment rinsate and laboratory method);
- Duplicate samples;
- Matrix spike/matrix spike duplicate samples (accuracy);
- Surrogate recoveries;
- Percent completeness; and,
- RPD (precision).

Farallon will review field records and results of field observations and measurements to insure procedures were properly performed and documented. The review of field procedures will include:

- Completeness and legibility of field logs;
- Preparation and frequency of field quality control samples;
- Equipment calibration and maintenance; and,
- Chain-of-Custody forms.

8.0 PERFORMANCE AND SYSTEM AUDITS

Performance audits will be completed for both sampling and analysis work. Field performance will be monitored through regular review of Chain-Of-Custody forms, field notebooks, and field measurements. Periodic on-site review of work in progress will also be performed by the Project Manager and/or the Project QA/QC Officer.

Accreditations received from Ecology for each analysis by the analytical laboratory demonstrates the laboratory's ability to properly perform the requested methods. Therefore, a system audit of the analytical laboratory during the course of this project will not be conducted.

The Project Manager and/or Project QA/QC Officer will oversee communication with the analytical laboratory on a frequent basis while samples are being processed and analyzed at the laboratory. This will allow Farallon to assess progress toward obtaining the DQOs, and to take corrective measures as problems arise.

Corrective measures will be the joint responsibility of the Project Manager and the Project QA/QC Officer.

The analytical laboratory will be responsible for identifying, and correcting (as appropriate) any deviations from performance standards as discussed in the laboratory QA/QC Plan. The laboratory will communicate to the Project Manager or the Project QA/QC Officer, all deviations to the performance standards and the appropriate corrective measures during sample analysis. Corrective actions are discussed in Section 11.0.

9.0 PREVENTIVE MAINTENANCE

Operation and Maintenance manuals will accompany all field sampling and measurement equipment. Included in these manuals will be procedures for start-up, calibration and system checks. All maintenance activities will be documented in field logs and/or equipment log books. A schedule of preventive maintenance activities will be maintained. In addition, spare parts and tools will be included in each equipment storage case to minimize equipment downtime.

10.0 DATA ASSESSMENT PROCEDURES

The Project Manager and Project QA/QC Officer are responsible for data review and validation. Upon receipt of each data package from the laboratory, calculations using the equations presented for precision, accuracy and completeness will performed. Results will be compared to qualitative DQOs. Data validation parameters are outlined in Section 3.0 of the Plan.

11.0 CORRECTIVE ACTION

Corrective actions will be the joint responsibility of the Project Manager and the Project QA/QC Officer. Corrective procedures can include:

- Identifying the source of the violation;
- Re-analyzing samples if holding time criteria permit;
- Re-sampling and analyzing;
- Evaluating and amending sampling and analytical procedures; and/or,
- Qualifying data to indicate the level of uncertainty.

During field operations and sampling procedures, the Project Manager and field team members will be responsible for identifying and correcting equipment malfunctions. All equipment malfunctions and corrective actions taken will be documented in the field notes. Corrective actions will be the joint responsibility of the Project Manager and the Project QA/QC Officer.

12.0 QUALITY ASSURANCE REPORTS

The final CAP report will include a quality assurance section which summarizes data quality information. This summary will include:

- Assessment of data accuracy and completeness;
- Results of performance and/or system audits; and,
- Significant quality assurance problems and their impacts on the DQOs.